Register Number: ……

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Second Semester

MECHATRONICS ENIGNEERING

U07MH201: Fundamentals of Mechatronics

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks

1. Industrial robot is a
   a) Primary level Mechatronics b) Secondary level Mechatronics
   c) Tertiary level Mechatronics d) Quaternary level Mechatronics

2. A good example for stand alone mechatronics is
   a) washing machine b) aircraft c) CIM d) humanoid robot

3. In feedback system, the systems
   a) stability increases b) gain increases
   c) sensitivity increases d) disturbance increases

4. The device which converts one form of energy into another is called a
   a) transistor b) transducer c) PLC d) microcontroller

5. Sensitivity of the instruments refers to
   a) sensing capacity b)accuracy
   c) the ratio between output and input d)the ratio between input and output

6. The gauge factor of a strain gauge is
   a) $\Delta L/L$ b) $\Delta R/R$ c) $\Delta R/R/\Delta D/D$ d) $\Delta R/R/\Delta P/P$
7. A 4/2 DCV has
   a) 2 ports 4 position b)4ports 2 positions
   c) 6ports 4 positions d) 8ports 3 positions

8. A relay isolates control circuit from
   a) High current circuit b) High voltage circuit
   c) Low voltage circuit d) Low current circuit

9. Thermography is a technique used for
   a) Temperature pattern monitoring b)Wear monitoring
   c) online quality monitoring d) vibration monitoring

10. The supervisory control is used
   a) Online inspection b)offline inspection
   c) spot inspection d) quality inspection

PART B (10 x 2 = 20 Marks)

11. What is Mechatronics? Give an example

12. What are the important subsystems involved in Mechatronics system?

13. Differentiate between sensors and transducers

14. What are encoders? How it is categorized?

15. List out the process that occurs in conditioning a signal.

16. State sampling theorem

17. Distinguish between Hydraulic and Pneumatic system

18. What is relay? State its type.

19. What is condition monitoring?

20. What is meant by sequential control and give an example.

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss in detail the scope of Mechatronics in Industries. (7)

(ii) Compare the traditional design and Mechatronics design with suitable example. (7)

(OR)

b) (i) Briefly explain the key element of the Mechatronics system (7)

(ii) Explain the Mechatronics design process (7)

22. a)(i) Explain the working principle of LVDT. (7)

(ii) Briefly explain the Quality parameters of an instrumentation system. (7)

(OR)

b) (i) Explain the principle of operation of Ultra sonic distance sensing and stress sensin. (7)

(ii) Explain the principle of operation of Hall effect sensors. (7)

23. a) (i) Describe the Analog to Digital Conversion (ADC) in signal conditioning. (7)

(ii) Briefly explain the different types of control systems with suitable examples. (7)

(OR)

b)(i) Explain the basic structure of a PLC system. (7)

(ii) Discuss the working of microprocessor based controllers with relevant examples. (7)

24. a) (i) Describe the elements of Pneumatic system. (7)

(ii) Describe the working principle of Double acting hydraulic cylinder (7)

(OR)

b) (i) Explain 4/2 solenoid actuated direction control valve with neat Sketch. (7)

(ii) Explain the working principle of slider-crank actuation mechanism. (7)

25. a) (i) Discuss the supervisory control system in manufacturing Inspection. (7)

(ii) Explain briefly about various monitoring methods in Mechatronics Systems. (7)

(OR)

b) (i) Explain the robot control circuit diagram of a pick and place robot.

****